

Media release

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Cancer research leukemia

Targeted elimination of leukemic stem cells

Cancer research in Bern has discovered a further mechanism to combat leukemia: a research team at Inselspital, Bern University Hospital and the University of Bern has succeeded in identifying an important signaling pathway for regulating leukemic stem cells. With this discovery, the researchers are expanding the arsenal of potentially highly effective drugs against leukemias (“blood cancers”).

Leukemia is caused by leukemic stem cells which are resistant to most known therapies. Relapses are also due to this resistance. Leukemic stem cells arise from normal blood-forming (hematopoietic) stem cells. Because they are closely related, leukemic and hematopoietic stem cells share many of the same signaling pathways. If the proliferation of leukemic stem cells is to be stopped, it is crucial to find signaling pathways that are active only in the leukemic stem cell, but not the normal one. With this goal in mind, Prof. Adrian Ochsenbein and his team are conducting research at the Department of Medical Oncology at Inselspital, Bern University Hospital. The latest discovery, the so-called LIGHT/LTbR pathway, is presented in Sabine Höpner’s article published today in *Nature Communications*.

A new approach to controlling leukemic stem cells

In normal blood formation, the LIGHT/LTbR signaling pathway plays no role in hematopoietic stem cells. It is important in maintaining stem cell function only in situations of increased demand, such as after chemotherapy. In contrast, leukemic stem cells always rely on this signaling pathway. The LIGHT/LTbR signaling pathway leads to increased symmetric cell division and thus proliferation of leukemic stem cells. If the pathway is blocked with monoclonal antibodies, for example, the stem cells lose their stem cell function and die. Furthermore, the LIGHT binding site is significantly more abundant in leukemic stem cells than in normal stem cells. In laboratory experiments, animals with leukemia survived significantly longer when the newly discovered signaling pathway had been blocked.

The latest contribution is a beacon of hope for future leukemia treatment

The results published show that multiple receptor/ligand pairs are involved in the maintenance of leukemic stem cells. The researchers believe that the new approach (blocking LIGHT) may lead to an improved therapy of various types of leukemia in the future.

Therapy with medications that aim to block various immune receptors and ligands has revolutionized the treatment of cancer diseases. However, important drugs used to treat solid tumors are not effective in treating leukemia. Therefore, the [CD70/CD27](#) and LIGHT/LTbR signaling pathways that we have defined represent an important advance in improving immunotherapy in myeloid leukemia. Research groups at Stanford have developed antibodies against CD47 that activate another immune signaling pathway (phagocytosis). These new drugs are already in phase II development for the treatment of acute myeloid leukemia.

Experts:

- Prof. Dr. med. Adrian Ochsenbein, Director and Chief Physician, Department of Medical Oncology, Inselspital, Bern University Hospital
- Dr. phil. nat. Sabine Höpner, Department for BioMedical Research, University of Bern

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Links:

- Original article: DOI <https://doi.org/10.1038/s41467-021-21317-x>
- [Information on CD70/CD27, cusatuzumab](#)
- [Universitätsklinik für medizinische Onkologie, Inselspital, Universitätsspital Bern](#)
- [Department for BioMedical Research, University of Bern](#)
- www.ochsenbeinlab.ch

Insel Gruppe

The Insel Gruppe is Switzerland's leading group of hospitals for university and integrated medicine. It offers comprehensive health care based on groundbreaking quality, research, innovation and education. The six Insel Gruppe hospitals (Inselspital, Aarberg, Belp, Münsingen, Riggisberg and Tiefenau) carried out around 800 000 outpatient consultations and treated about 60 000 in. The Insel Gruppe employs almost 11 000 members of staff from 100 nations. It provides training for a large number of professions and is the most important institution for the further training of young physicians.

Further Information

Department for BioMedical Research (DBMR)

More than 25 years of biomedical research in Bern: The Department for BioMedical Research DBMR was founded in 1994 and is a research department of the Faculty of Medicine of the University of Bern with the mission to provide the researchers of the Inselspital, Bern University Hospital, with the best possible working environment and infrastructures. The DBMR manages state-of-the-art core facilities, and also provides researchers of the department with adequate laboratory and working space. 47 independent research groups, covering almost all fields of biomedical research, are affiliated to the DBMR. Its strategy is to support clinical research in an integrative manner bridging laboratory-based and patient-oriented clinical research. In addition, it puts a strong emphasis on the development of translational approaches and the use of omics technologies.

[Further information](#)